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EDITED BY J. HAY TAYLOR.

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NOTICE.

SINCE THE PUBLICATION OF OUR LAST ISSUE, WE HAVE MOVED OUR OFFICES TO

56, CHANCERY LANE, W.C.

TO WHICH ADDRESS ALL COMMUNICATIONS PERTAINING TO THIS JOURNAL SHOULD BE ADDRESSED.

Notes.

THE Governors of the People's Palace, London, have decided to hold an exhibition of Pictures from 13th inst. to Sept. 10. Last year when a similar exhibition was held, it was visited by upwards of sixty thousand persons.

* * *

WITH reference to our remarks in last issue that the lantern had, on June 16, been used for the first time at Stationers' Hall, Messrs. Webster & Girling write to inform us that we should have said "second time," for on Oct. 2, 1889, they showed over 100 slides with a triple lantern in this venerable hall, and that they were at the time informed that that was the first occasion on which the lantern had been employed there.

* * *

AN outing and dinner, to commemorate the opening of their new workshops, was given on 2nd ult., to their employes, by Messrs. Newton & Co., of Fleet Street. A large attendance gathered at Kingston, and a pleasant time was enjoyed.

* * *

THROUGHOUT the British Isles the lantern has been largely adopted in connection with the recent election returns. Screens have been erected in prominent available places, and the number of people that have read the results of the polls projected thereon has been—well, we will say—large.

A GIGANTIC painting (panorama) has just been completed in Germany for the World's Fair; it is about 450 feet long and 50 feet high, and represents the Bernese Alps.

* * *

ANTHONY'S International Annual is in future to be published in December instead of Midsummer.

* * *

A LETTER from a correspondent states that "all paraffin lamps should be stamped the same as gas meters. Government supervision would thus cause accidents to be minimized." There is more rubbish in the form of lamps sold than one would imagine.

* * *

IT has been stated that an alloy of 400 grains iron filings and 200 grains antimony has the curious property of emitting red and white sparks when rubbed with a file.

* * *

MR. A. WILSON, of the well-known firm of G. W. Wilson & Co., Aberdeen, is at present making an extensive trip in the United States, combining business with pleasure.

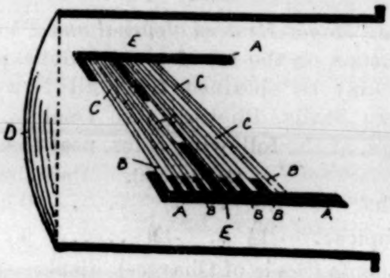
* * *

IT has been proposed that those interested in photography, and who intend visiting the Chicago Exhibition next year, form themselves into a party. Mr H. Snowden Ward (Practical Photographer), has taken upon his shoulders the task of formulating an initiative programme. Those who are at all likely to visit this Exhibition are invited to send their names to Mr. Ward, Memorial Buildings, Farringdon Street, E.C.

Stereoscopic effect with the Lantern.

IN our April number we mentioned that Messrs. Field & Co., Birmingham, had solved the problem of Stereoscopic effect upon the screen, An ingeneous little instrument of which we give a cut, is used to bring about the effect mentioned. One of two slides prepared from pictures taken by a stereoscopic camera is placed in one lantern and the other slide in a second lantern. Into the optical system of each lantern is introduced, either between the condenser and objective or before the objective or between the radiant and condenser or in any other position, but preferably between the lenses of an objective of a Petzval combination—a Nichol's prism plate of tourmaline. Preferably a number of glass plates placed at the requisite angle for producing polarization by refraction, enclosed in a convenient case or frame, will be used. These plates are so arranged in each lantern that the light from one will emerge polarized in a plane at right angles to that emerging from the other. The images of the two slides or pictures so polarized are projected and superposed on a screen, preferably a calico screen covered with dead silver paper.

These superposed images are viewed by the observer through a pair of analyzers of any construction capable of effecting the requisite amount of analyzation and these are set with their planes of polarization at right angles to each other. One analyzer will permit the image of one of the pictures—the one polarized in the same plane to pass through to the eye, whilst the second picture, polarized in a plane at right angles to it, will not pass; with the second analyzer this order is reversed, the image of the picture stopped by the first analyzer passing through it, whilst the other is stopped. Therefore upon each eye of the observer the image of a different picture falls, and as the two pictures are as nearly as possible superposed on the screen, an image of one stereoscopic picture falls upon the retina of one eye and an image of the second stereoscopic picture upon a corresponding portion of the retina of the other eye. The conditions being fulfilled under which stereoscopic vision of two pictures is possible the one picture seen appears in relief.



The analyzers designed for this purpose are made of a number of thin glass plates, and the necessary polarization is effected by refraction. These glass plates are set at a proper angle in a mount resembling a very small opera glass or any other form more convenient.

The plates are arranged at slightly varying angles to each other in the same plane, for, if a number of plates be placed flat one upon another, around the principal image a number of fainter images are formed, and thereby the definition or clearness of the principal one is impaired. By arranging the plates as described a well defined picture is obtained.

Reference to the accompanying drawing shews one method of arrangement of the plates and the positions they assume. In the sectional elevation shewn A. A. is the box or case for containing and holding the glass plates C. C. B. B. are strips of metal or suitable material attached to the glass plates in order to give same different angles in same plane. C. C. are the glass plates seen on edge in position in the box or case A. A. D. is the lens of objective of lantern, into which the case of glass plates is introduced. E. E. diaphragm.

The following is the claim made in the patent specification, No. 11,520, 1891: The scientific arrangement of the several parts constituting an apparatus for giving, by polarization or partial polarization of the light, a stereoscopic effect to pictures and such like projected upon a screen or elsewhere, and forming thereby a method or system by means of which such pictures or other objects being so projected from an optical or magic lantern or lanterns are seen in relief substantially as herein more fully set forth and described.

—:o:—

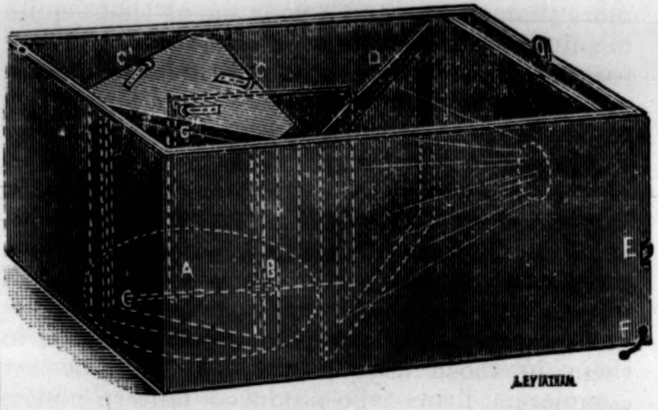
Hand-Cameras for Obtaining Slides for the Lantern.

	"Facile"	(Fallowfield)	see March 1st, 1890
No. 1	"Giah"	(Mawson & Swan)	„ May 1st, „
„ 2	"Quadrant"	(W. H. Humphries & Co.)	„ June 1st, „
„ 3	"Eclipse"	(J. F. Shew & Co.)	„ July 1st, „
„ 4	"Eureka"	(W. W. Rouch & Co.)	„ Aug. 1st, „
„ 5	"Key"	(Platinotype Co.)	„ Sept. 1st, „
„ 6	"Optimus"	(Perken, Son & Rayment)	„ Oct. 1st, „
„ 7	"The Griffin"	(Griffin & Sons, Limited)	„ Nov. 1st, „
„ 8	"The Swinden-Earp" Patent		„ Dec. 1st, „
„ 9	"Collins"	(C. G. Collins)	„ Feb. 1st, 1891.
„ 10	"Kodak"	(Eastman Co.)	„ Mar. 1st, „
„ 11	"Guinea"	(Walter Griffith)	„ April 1st, „
„ 12	"Vanneck"	(Watson & Sons)	„ May 1st, „
„ 13	"Chadwicks"	(W. I. Chadwick)	„ June 1st, „
„ 14	"Bonanza"	(R. & A. J. Mercer)	„ July 1st, „
„ 15	"Repeater"	(J. F. Shew & Co.)	„ Aug. 1st. „
„ 16	"Marvel"	(Wilson & Son)	„ Sept. 1st. „
„ 17	"Talmer"	(Talbot & Eamer)	„ Oct. 1st, „
„ 18	"The Omnigraph"	(J. Lancaster & Son)	„ Nov. 1st, „
„ 19	"Ubique	(Perken, Son & Rayment)	„ May 1st, 1892.
„ 20	"Daylight Kodak"	(Eastman Company)	„ June 1st, „
„ 21	"The Radial"	(Marion & Co.)	„ July 1st, „

No. 22 "SURPRISE."

The changing mechanism of this ¼-plate hand camera is entirely different from any we have hitherto seen. The plates are arranged in triangular form, the bases of which are turned as desired to face the lens. Had the plates been placed on fixed bases this would have limited one charge of plates to three only, but the patentees ("Leviathan," London) here adopt an ingeneous mode of doubling the number of plates contained in the camera; this if effected by making each base of the triangle alluded to, revolve, and as one plate is fastened at either side, six plates can be easily brought in succession to the focussing plane.

The foregoing states the general principle upon which this camera is constructed. In order to charge the camera, it is necessary to slightly withdraw the sliding lid on top—a couple of inches is quite sufficient—when the groves of a plate carrier will be seen. A plate having been dropped into these, a small handle at the other side of camera is turned, which causes the side of the triangle or revolving prism to be turned round. The loaded carrier is now inside of the triangle, and another plate may be placed in the carrier now presented, after which the second side of the revolving prism is presented in front of the lens, by the movement of a lever. The second set having been loaded in like manner, the lever is again moved and the third side charged.



We start with the camera charged, and having made the first exposure, it becomes necessary to bring another plate into position. The button C, which is presented at a small hole in the camera, is turned round, this changes the side of the prism and presents the second plate to the lens.

When it is required to bring the second and third pair of plates into position, a lever working under the camera is turned until a catch with which it is provided engages in a slot. An automatic mask in front of the focal plane prevents access of light to the back portion of the camera, this mask is hinged and kept closed by a spring. When turning the lever which revolves the prism, and the knob which turns the plate carriers, the motion should be from the opening to the hinge of the mask. The lens is single achromatic, and the shutter is adapted either for time or instantaneous work. A pull on the string F sets the shutter, whilst it is liberated by a slight pressure on E. The apparatus is covered in cloth, and can be obtained from most photographic dealers.

Magic Lantern Matters.*

By W. I. Chadwick.

On the present occasion I shall not have much to say about the magic lantern anterior to the introduction of Marcy's Sciopticon (from America) by the late W. B. Woodbury. Of course it is quite true that we had lanterns before the sciopticon, and these were of two types, one for burning oil which was nothing more than a toy—and a poor one at that—quite unsuitable for anything more than showing painted slips on screens very little larger than a pocket handkerchief; the other was a big clumsy oxy-hydrogen lantern, which was chiefly used for Sunday-school meetings, mechanics institutions and by a few private exhibitors and lecturers. We had occasionally a good deal of talk about using the lantern for educational purposes, but there was very little practical work done in this direction; not many amateur photographers made lantern slides, or paid much attention to them in those days. But there were a few commercial firms who produced lantern slides, and the introduction of the sciopticon must have vastly increased their business, for that beautiful little instrument not only filled up the gap between the already existing instruments: it did more, it was capable of taking the place of both; with its two-wick oil-lamp it was possible to exhibit photographs in the drawing-room on from five to six feet and up to seven feet screens without much trouble, and also by the same instrument, using limelight, the largest screens were just as brilliantly illuminated as by the most ponderous lantern ever constructed; indeed, the sciopticon came at the right time, it was just the very thing that was wanted, and it became so popular as to be almost a part of every amateur's paraphernalia.

I believe it to be a fact that Woodbury did take provisional patent protection for the sciopticon lamp in this country, and that during the first year they were placed upon the market over 400 were supplied, but by an oversight, or we may say neglect, for Woodbury was not a business man, the patent was not completed. Other firms took advantage of this, and very soon placed similar lanterns before the public at a slightly reduced price. I am informed that one firm alone supplied 1,000 of these in the following year. We had not long to wait before several so-called improvements were introduced and patented, but it may be said that nearly all the oil-burning lamps for lantern purposes used to-day are more or less the progeny of the sciopticon.

The sciopticon was originally constructed to burn one-and-a-half-inch wicks, placed edgeways to the condenser, and with the exception of some improvements in the combustion chamber, made by Mr. George Smith, the present proprietor and manufacturer, it remains in its original state. Some of the so-called improved lamps are made to use three, four, and as many as five wicks, and these up to two inches and two and a half inches wide, either placed parallel, converging, or diverging, and some again take other forms, the intention being to increase the illuminating power.

Now, if it were necessary, I could give my experiences of many years with nearly all these multiple wick-lamps, and down to the latest patent before the public; but, to be brief, I see no advantage in them for the purpose for which oil-lamps are suitable. There undoubtedly is in some an increase in the size of the flame; but for lantern purposes a large volume of flame is not required. It is intensity that is necessary, and the intensity must be in the right place, which is the focus of the condenser, and is confined to a very small area, and it can be shown to be a positive disadvantage to have more volume than is required. Then, again, the enormous heat given off by some of these powerful lamps, resembling a roaring furnace, is another very great disadvantage. Added to this is the difficulty to keep the wicks burning evenly, by reason of unequal combustion, for very soon the wicks begin to "fork," one flame gets higher or lower than the rest, the thing begins to smoke, to smell, the light goes bad, and the whole affair has to be readjusted; but with the two-wick lamp there is none of these troubles. It is quite easy to adjust the lamp at the commencement, so as not to require the slightest attention for three or four hours.

It has been stated by some amateur lanternists that with So-and-So's or somebody else's lamp they have exhibited ten-feet pictures, and we know there are some gentlemen who are always cleverer than anybody else, and sometimes these gentlemen are so carried away by their enthusiasm as to believe they have done something big, or, at any rate, to tell us so. I can light my dining-room by a farthing candle, but I do not think you would care to be entertained at dinner by such an illumination. Then, we have somebody's lamp compared to a limelight. Well, of course, we can compare the light of a candle to the electric arc light; but for *equality* of illumination the comparison is a very poor one.

The limit in size of picture shown by any oil lamp, is in my opinion, six feet square where photographs are the pictures, but it is possible to select a few photographs of certain subjects that might be tolerated to seven feet, and perhaps more, but after seven or eight feet the blow-through limelight becomes necessary, and this may be used up to ten or even twelve feet, and after that the mixed jet, with oxygen and hydrogen under pressure, is indispensable. Ether may be used in place of hydrogen or coal gas, but I see no advantage in its use in any way.

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* South Manchester Photographic Society.

The oil-lamp, then, as I have stated, is only suitable up to six feet screens, and the question comes now, is six feet large enough? The answer to that is, it depends where it is to be used and the size of the audience. I have given a good deal of pleasure to private friends at home by even a less picture, but in a private drawing-room or a dining-room it is not always convenient to fix a six-feet screen, and very often when it is convenient there is either a fire burning in the room or some abominable reflections, that cause a good deal of trouble by interfering considerably with the results. All these objections are dispensed with by using a transparent screen such as I now introduce. In this little waterproof case, not unlike an umbrella-cover, except that it is a little longer, is a roll of a particular kind of semi-transparent paper three feet eight inches wide. The outer end of it is attached by six drawing pins to a wooden lath five-eighths of an inch square, having suitable fittings for attaching to two light stands, also contained in the waterproof case. The screen, as you will see, can be erected on one end of a dining-room table in three minutes; and, if the table is long enough the lantern can be placed at the other end. The audience sit in front, and I think you will be surprised to see how beautiful pictures look when projected in this way. The reflections from the house-fire do not interfere with the results in the slightest degree. We may even permit a tolerable light in the room, and you may strike a match to light your cigar without impairing the brilliancy of the picture. And, now that all is ready, you see a beautifully illuminated picture three feet six inches square by a sciopticon, and which I maintain is large enough for most private-house exhibitions, or even in a small schoolroom, where the audience is not too large.

I am not advocating small screens in preference to large ones, for all depends upon circumstances; but I do prefer a well-lighted small screen to a large one with inferior illumination, and especially so when we can get to the best position from which to view the pictures; and here another matter may be of interest.

The lanternist inquires what is the most suitable sized screen for a certain size room? and the audience ask which are the best seats to see the picture from? To say that the screen ought to be in proportion to the size of the room is the general way of putting it, and to sit about the middle of the room is the usual reply to the best position,

Now, it is an established fact, which was recently demonstrated at the Stereoscopic Club, that the most correct position from which to view any photograph is at the angle at which the photograph was taken. Thus, if we make a picture by a twelve-inch lens, and we wish to appreciate size and perspective correctly, we must view the picture at twelve inches from the eye. To examine it at a nearer distance is equal to it being taken by a longer-focus lens than twelve inches; and to see it at a greater distance gives the impressions of one taken by a shorter-focus lens. Then, if we make quarter-plate negatives by a five-inch lens, to see it correctly we must either use a magnifying-glass or a stereoscope, or we may magnify it by the lantern; but the principle is just the same. If we make lantern slides by contact from quarter-plate negatives taken by five-inch lenses, and mask these down to 2¾ inches, as is usual, and then project these slides to 6 feet, we have a magnification of 26 diameters; then 26 by 5 (focus of lens) gives 11 feet. If we project the slide to 12 feet, or about 52 diameters, this, multiplied by 5, will show us that, at 22 feet, we should see the pictures at their best; and, from what has now been said, it will be understood how incorrect it is to make lantern slides which are to be shown in series from negatives taken by lenses of different foci, or what comes to the same thing, is making contact slides from quarter-plate negatives and other contact slides from portions of whole-plate and even larger negatives.

At a lantern exhibition, not very long ago, a series of slides of Haddon Hall were shown. The photographer had used a nine-inch focus lens for most of the exterior views, but for all the interiors a five-inch lens was used. I well remember the view from the terrace steps, showing the main front of the building, with the ball-room windows; and the next view was the interior of the ball-room. It looked so very large, that no person in the world who did not know the architecture could have imagined a room of such dimensions to be contained in the building we had just seen upon the screen. It was as ridiculous as for an architect, to submit unfigured plans of the rooms in a house all drawn to different scales, to fill up the paper, and where the bath-room and the w.c. might be shown the same size as the dining-room, no true idea could be formed from such drawings or such photographs.

A similar misuse in lenses was made by a friend of mine who went to Norway last year; he had a half-plate camera, and a seven-inch rapid rectilinear lens. About half the number of his pictures were taken by this lens, and the others by one of the combinations of the lens only, which would be about fourteen inches focus. He said it saved him the trouble of walking or climbing to places where, say, a waterfall would have been too small to fill his plate if taken by the seven-inch combination; the result is, that nearly all the waterfalls in Norway, judging from his pictures, are the same size, and no true appreciation of size or distance is possible from his *series* of pictures.

About the artistic side of the question, I am not here to-night to discuss, though admitting there may be circumstances where, on the same size plate, a seven-inch lens will be better than a five-inch, or *visa versâ*, but I repeat, and with emphasis, that the too frequent use of lenses of great disparity in focus for lantern slides is a mistake.

It may be said in conclusion that the focus of the lantern objective has nothing whatever to do with the subject of this communication.

:o:

A Visit to Rye.—A New Reflector.

By T. H. Holding.

Vice-President of the Lantern Society.

Rye is interesting to various classes of persons. First to the nautical. It is a small town of barely 3,000 inhabitants, but it has a history which is closely interwoven with that of England. Founded by the Romans, spoken of as an ancient town in the time of Edward III., twice entirely destroyed by the French, once standing on the sea shore, now two miles away, it makes a thrilling chapter indeed. It has an interesting land gate, ancient church and castle tower.

To the photographer it is interesting, because it is one of those places where there is "plenty to do." Two amateurs met in London in a dining room in the West End recently. One said, "Well, have you been doing anything lately?" "Oh, yes, heaps." "Where at?" "Bournemouth." The other coolly replied, "Bournemouth? What on earth could you find to photograph at Bournemouth?"

Now, nobody could ask that about Rye. Its quaint steep streets are well worth photographing. A few views of its old land-gate, at least three or four shots of the ancient tower, which is indeed a castle, may be taken. There are groups of fishermen, one or two little shipyards, numbers of quaint old boats and shipping in the narrow confined harbour; all these make interesting subjects; whilst the church, inside and out, would make half a dozen pictures, and the shots from its tower are by no means mean.

But then a visit to Rye is not complete without a visit to Winchelsea. Winchelsea was a place rebuilt centuries ago on its present eminence, and its great gates now stand; but, of the forty squares into which the town was laid out, one is intact, and the others are still traceable. But the church is interesting, the gates are interesting, the cottages are interesting, and the streets are picturesque, and its great vaulted cellars tell of the past. It is a pleasant walk of three miles from Rye.

But then Rye will also be specially interesting to the laternist, seeing that is the head-quarters of Stocks' lamp. The quiet persistent experiments, which have resulted in a very effective and excellent lamp, are highly creditable to Mr. Stocks himself, and have been highly helpful to lanternists the country over; not that the lamp alone takes up the whole of Mr. Stocks' time. He is trying experiments in other directions, and some of them are of a very interesting kind. The distance, for instance, to which artificial light may be transmitted, either for signalling, illumination, or other purposes, is at present receiving his attention. But what is most interesting to us is, that he is working on a reflector, about which I am not at liberty to speak, that—if he ultimately succeeds in putting the article on the market, and which, by the way, he has succeeded in perfecting—will revolutionise exhibitions with oil lights. Let me state a fact that will startle every reader of the *Optical Magic Lantern Journal*, and set him thinking. Mr. Stocks lit up an ordinary little paraffin lamp with a tiny round wick no thicker than a pen holder. Such a light in an ordinary room is just sufficient to show its dimensions and outline, but scatters no power of light. He then placed one of these little things some inches from the condenser in one of his lanterns, and then placed behind it in a certain position his new reflector, and afterwards put an ordinary photographic slide in the lantern, and I am declaring the truth when I say that this showed the pictures as distinctly as I have seen them projected by a 3-wick lamp, and the disc was at least 4 feet in diameter. Need I, in order to prove this startling statement, go further. Perhaps it would be safest to do so. Various ordinary reflectors were then placed behind the same little benzoline lamp, but they only made the illuminated disc bright in the centre, and the sides graded off into phantom-like darkness. Personally I have strong faith that sooner or later this invaluable invention will become, as it deserves to be, an indispensable adjunct to the oil lantern, and if to the oil why not to the lime light?

—:o:—

The Lanternist's Den.—No. 3.

By C. E. Rendle.

How I made an Oxy-calcium Lamp.

A fellow Lanternist called upon me not very long ago, and informed me that he was in difficulties over an oil lamp, that had met with all but a fatal accident, inasmuch, as it had fallen from a considerable height, which had doubled up the wick-holders, dented in the cistern in an irretrievable manner, and generally —to use a schoolboy's phrase—"upset its apple cart."

My friend had taken upon himself the task of repairing his damaged four-wicker, apparently without the slightest chance of success, for when he had untied the parcel which he had brought, and disclosed the object of his mission, I was treated to a view of one of the worst cases of collapse that has ever come under my notice.

The sight of the *débris* brought to my mind vivid recollections as to how, on one occasion, a lamp of my own got out of sorts (though not approaching his case), of how I set to work to put it right; of how I remembered, that in trying to solder one part, another toppled hopelessly over; of how, too, after spending many hours, my labour produced but a sorry spectacle. Of how, at last, I resolved to take the whole thing to pieces and commence to build from the beginning. This I did, and—after a fashion—completed the job; but since that experience, have ever paid ungrudgingly, a respectable price whenever this part of my apparatus requires attention. So the advice to my friend was, "Give it a good crack with a hammer, and when nobody is about, drop it into the dust-hole." "Don't be mean," I continued, "but buy one of the latest improvements in the line" for, reader, I advocate a good lamp as a handy and useful instrument, and, I believe, one which all lanternists prize.

But as my friend was bent on trying his hand at something, I introduced a spirit jet, which I had just completed—in fact, the Aspinal enamel with which it was coated had not quite set—and strongly recommended him to make one, it being extremely easy to accomplish. He consented, and has since thanked me for the suggestion. I will briefly notify the course adopted.

I was first prompted to make one of these lamps in February last, after reading the description, and well studying the diagram which demonstrates accurately the theory, on page 14 of *The Optical Magic Lantern Journal* for that month, and, in justice to the Editor, must direct special attention to that article to any of the numerous readers who should attempt to undertake a like task.

Whatever you do, be particular that you thoroughly understand the object to be achieved, as that is more than half the battle.

Provide a couple of tin cannisters, the largest measuring $4\frac{3}{4}$ in. high, with an inside diameter of 3 in. This I will call the air chamber. The smaller one, or spirit chamber, must fit easily into this, with, say, an air space of $\frac{1}{32}$ in. all round, and may be cut down $\frac{3}{8}$ in. shorter than the outer one. Cut in the centre of the bottom of the spirit chamber a circular hole $\frac{3}{8}$ in. The valve for this is a flat piece of tin 1 in. diameter with a piece of wire of sufficient strength soldered through its centre, leaving about an inch on each side, this is the valve rod or piston. The valve bridge is formed by taking a flat piece of tin $\frac{3}{4}$ in. wide and $3\frac{1}{4}$ in. long, and making a hole in the centre to act as a guide to the piston rod. Bend the tin to form a bridge until it fits into bottom of spirit chamber, and fix each side with a little solder to secure it in place, taking care before so-doing to place the valve in position allowing one end of rod to come through hole in bridge, the other end to fall through bottom of chamber.

A piece of tin 1 in. diameter with a $\frac{1}{2}$ in. hole in centre should be slightly domed and soldered over hole at bottom, this is to facilitate the pouring in of the spirit.

Now make a flat top sufficiently large to rest upon the edge of the air chamber, and see that it is securely soldered all round, for, bear in mind, this chamber must be air tight, except at valve. This part is now finished and may be put aside.

Turn a ring from a piece of wire to fit tightly inside the top of the air chamber and solder all round. As this is only for strength, it may be dispensed with if desired, but I would recommend it. Cut a $\frac{1}{2}$ in. hole in bottom, make your sliding socket, and, having tapped your hole for thumb screw, solder at side about $1\frac{1}{2}$ in. up.

Take a 9 in. length of $\frac{3}{8}$ in. brass tube with a $1\frac{1}{4}$ in. length of $\frac{1}{2}$ in. soldered at right angles at one end, with a piece of flat metal ready tapped to take lime pin fixed near top. The oxygen tube may be smaller, and should be bent with the fingers in shape corresponding to the drawing and hard soldered. (By the way all solderings in the vicinity of the lime must be hard.)

A small brass tap, which can be purchased for sixpence, must be fixed at end of oxygen tube.

The end of spirit tube may now be plugged or soldered up, and a hole made about ½ in. from end, to come under the hole in the air chamber. They can then be tied together with iron binding wire and securely soldered.

The nipple of oxygen jet will greatly depend upon the skill of the worker, and may assume almost any shape, so long as the aperture is not too large—size of a moderate pin will do. The stream of gas is, of course, blown direct through the body of flame.

The wick-holder requires a little attention. Lay together three small pieces of tube, and let them through a piece of flat brass triangle-wise, and fit this into the end of spirit tube, but not too tightly, as it has frequently to be removed.

The job is complete with the exception of regulating the piston rod, and, as this is most important, it should be adjusted to a nicety. The rod may be left as near as possible 1/16 in. longer than would be necessary to touch the bottom of air chamber. The lamp being now finished may be charged and set burning, and if there are any defects about its construction they will in a very short time make themselves apparent. It will, of course, require a little care and judgement, but, as already remarked, if at the outset the theory has been thoroughly grasped, the practice will show at a glance if anything be wrong.

I painted my jet black with Aspinal's, but tastes differ, so I leave that to the judgment of those who may make one.

A word of caution—should it be found necessary to do any soldering to spirit chamber after it has been once charged with spirit, be sure and see that it is quite dry before applying heat, turn it upside down that any vapour may escape through the open valve; otherwise, should heat be applied to a closed vessel containing but a few drops of spirit, an adjective might soar heavenward, that is, if it gets the chance.

——:o:——

Ether Saturators Fourteen Years ago.

By Continental Subscriber, J. M. K.

In the correspondence column of the June *Optical Lantern Journal* Mr. Scott gives—under the heading "Saturators, Patent Rights and Benzoline"—some extracts from the Patent specification of his Saturator, holding out that the "new" Saturator of Mr. W, Lawson is but a modification of his.

Permit me to draw attention to a description of a Saturator, constructed on the principles of Herr von Kalkow, which appeared in the *Photographic News* some time ago.

Now in this Saturator, both porous stuffing as well as heat are put to use, and it dates back as far as 1878, and compared with Scott's the latter looks just as much a modification of von Kalkow's as Lawson's does of Scott's.

Here the question arises upon what are based the Patent Rights.

As the article altogether may interest the readers of the *Optical Lantern Journal* I append copy of same.

It is about ten years ago that I began with lantern projections, which soon became my hobby, and have been ever since. I began with a "wonder" camera, which soon was followed by a pair of home-made, clumsy, wooden lanterns, but with good optical parts. If I remember well, it was in 1884 that I exchanged these giants for two sciopticons, with Newton's three-wick refulgent lamps. In 1886 I adopted the limelight. Luckily circumstances brought me into possession of a Polariscope (after the design of Prof. Paalzow, of Berlin), and from that moment the ordinary blow-through jet did not do any longer. I was in search of more light. My gas jets were interchangeable ones, I must point out that the oxygen outlet was not *round*, but *flat*, *somewhat* like a slit of four millimetres in length and half mm. in width. These jets give a powerful light. Now the mixed jets' turn began, after I had convinced myself that there was no doing with the blow-through. Two bags were used, and everything went on smoothly: but I disliked the trouble of having to do with two bags. I remember having read of some gasoline light, and a Herr Fr. Jul. von Kalkow was mentioned as the inventor. I had such an apparatus made for me, and give you here a drawing of it, which will better explain than describing it at full length. The whole is made out of zinc (see fig. 1). A and B are cylindrical vessels, one within the other, but with a space between each. A is occupied by stuffing of wool; B contains hot water filled in from F, and, after use, let out by N. The inner cylinder, C, is stuffed with curled horse-hair, and, by unscrewing E,

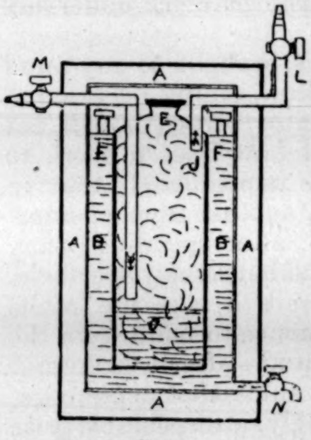

Fig 1.
Gasoline Tank for Limelight

gasoline or ether can be poured into it as far as the mark at C, so as to keep the level of the liquid to the opening of the H tube. The vapour is emitted at J to the tap L, from whence a tube carries it onwards to the H jet.

Now, Herr von Kalkow blew ordinary air through this apparatus, filling a second bag with the so saturated air. Having, however, read that blowing pure oxygen through it was more advantageous, I took at once to this method. The result was a much superior light.

It was in the beginning of 1887 that I adopted this method, but Herr von Kalkow constructed his apparatus long before that time, and the first description given is in 1878. Subsequently I found a description of the Broughton tank. I had one made, for economy's sake, out of tin. Its performance, however, did not please me. I had several pops with it, and I took again to my first saturator. One day the following idea struck me. I took my Broughton tank to pieces, and had all the partitions forming the circuit cut short to about one-third of an inch. I further did away with the chambers on the top, and in fig. 2 is shown, both in section and plan, the form of instrument I got.

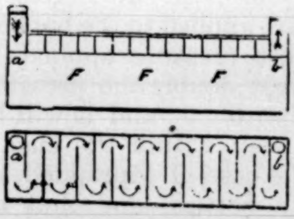

Fig. 2.
Modified Broughton Tank.

Into the empty space below (FFF) I put layers of coarse flannel and thick felt (such as is used under saddles) till the box was full, then I *pressed* the lid with the circuit on to it, and had it soldered tight down—the flannels and felt pressed together, and the zig-zag canal kept open. This modification made the saturator work very well, better than the one on von Kalkow's principle. I attribute the improvement to the greatly extended circuit, and the consequent better saturation of the oxygen. This alteration I made towards the end of 1887.

When the lantern season for 1888 began again, I found in an English catalogue an "ether saturator" recommended. Opening my own improved one, I found it all rusty inside. Instead of having a new one made like it in a more suitable metal, I decided to try the English one. I at once set to try this new one (manufactured by Sutton and Cutts), but it did not answer; but I am bound to say that the fault was not with the saturator, but with the jet, which, as I mentioned before, had a *flat* (slit-like) opening. So I at once ordered a pair of interchangeable jets suitable for the ether light. They arrived, and since that time the saturator, as well as the jets, have done their duty. I never have a blow-up or a pop, and always get a very good light for polariscope and microscope.

I learnt subsequently that Mr. Ives has also taken to the zig-gag circuit, but, if I am well informed, not before the year 1888, whereas I had already, towards the end of 1887, made a canal of this form to my tank.

Ive's patent, I am told, dates from 1882, and his improvement for the zig-zag from 1888. Scott's saturators came out in 1890. If these dates are correct, neither of them can claim the priority of the invention, either for the stuffed saturator or for the zig-zag canal on the one hand, nor for applying heat to the saturator on the other hand. Previous to them there was Herr von Kalkow, whose saturator was described in 1878, and I myself used a zig-zag canal as early as 1887 on the top of a layer of porous material.

I quote these dates as they may interest you, as I have no pecuniary interest in the matter at all.

If the ether light is not generally used, I think it is in consequence of its being associated with that ill-bearing name "mixed jet." If so, help can be brought with very little loss of light. I have designed a *blow-through* jet which is well adapted for the ether light. This same jet gives also a most brilliant light when two bags are used. It stands somewhat between the usual blow-through and the mixed jet, but *two* bags are necessary (see fig. 3). A and B are two ordinary nipples, of which A projects above B by about six millimetres (one-quarter inch). Both have equal bore of one millimetre (one-twenty-fourth of an inch). The A nipple makes an angle of 35°, and the B nipple one of 65° with the horizontal CD. From the point where the B nipple touches the A nipple, a small groove is worked into the under part of the A nipple, reaching to the point of the burner. I think it would be worth your while to have such a jet made, so that you could for yourself form an opinion of its merits. This form of jet is very advantageous for those demonstrators who would like a better light than is obtainable with the ordinary blow-through, and yet would not like to use a mized jet.

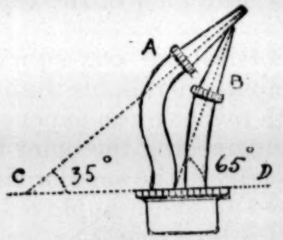

Fig. 3.—Blow-through Jet for the Ether Light.

With *one* bag for the oxygen and the gas from the main supply, the jet *is not suitable*, but when two bags are used with a weight of one and a half hundredweight to begin with, the jet gives a light very near to that by the ordinary mixed jet. I should very much like to see such a jet worked with two cylinders, of which, as yet, I have no experience.

With the ether the jet is safer than the mixed jet, because the vapour and the oxygen are kept separate till the igniting point is reached, and another advantage is that the peculiar construction causes the hydrogen element to heat the oxygen nipple, and the heated oxygen increases the intensity of the light.

—:o:—

Strength of Cylinders for Compressed Gas.

By Keith S. Murray.

There are two kinds of steel bottles generally in use for the transport of gasses at high pressure. They are known in the trade as lapwelded and solid drawn. Both are made of mild wrought steel, with the difference that the lapwelded bottles are rolled and welded up like ordinary tubes, whilst the solid drawn bottles are formed from a circular slab, or a circular block of steel, which by repeated heating and pressing in suitable dies is moulded into a tube with a spherically closed end. The process of solid drawing acts beneficially on the strength and rigidity of the metal, it has been found from tests made that the ultimate tensile strength of this metal is about 66,000 lbs. per square inch, as compared with about 54,000 per square inch in the case of welded bottles.

The solid drawn bottles are consequently lighter, neater and perhaps more reliable than the lapwelded, and although rather more expensive, are slowly but surely superseding the older lapwelded type, more especially in the smaller sizes. All bottles, or at any rate all these employed for non-liquefied gases, are made to contain a certain easily measurable quantity of gas at a pressure of 120 atmospheres, which is the recognised standard pressure.

Both classes of bottles are now made of three common external diameters, viz., 4 in., $5\frac{1}{2}$ in. and 7 in. and they vary in length according to the quantity of gas they are required to contain at the standard pressure. The thickness of these bottles is as follows :—

External diameter,	4 in.,	...	solid drawn,	$\frac{5}{32}$ in.
,, ,,	4 ,,	...	lapwelded,	$\frac{3}{16}$,,
,, ,,	$5\frac{1}{2}$,,	...	solid drawn,	$\frac{7}{32}$,,
,, ,,	$5\frac{1}{2}$,,	...	lapwelded,	$\frac{1}{4}$,,
,, ,,	7 ,,	...	solid drawn,	$\frac{9}{32}$,,
,, ,,	7 ,,	...	lapwelded	...

(No lapwelded bottles are now made beyond $5\frac{1}{2}$ in. external diameter).

Bottles of various other sizes and thicknesses are in use but they are gradually being superseded by these standard sizes, and in the course of a very short time they will probably have become extinct. As regards the ultimate strength of bottles, many tests have been made in order to ascertain their bursting point and elastic limit, and as all the above sizes (which are the standards adopted by the Brin's Oxygen Company, and the various Companies working under their patent rights) are constructed of nearly proportionate strength, the results may be generally summarized as follows :—

Pressure per square in., at which bottle bursts	lapwelded ...	$2\frac{1}{2}$ tons.
	solid drawn ..	$2\frac{1}{2}$,,
Limit of elasticity per square in. of metal ...	lapwelded	35,000 lbs.
	solid drawn	45,000 ,,
Ultimate tensile strength per square in. of metal	lapwelded	54,000 ,,
	solid drawn	66,000 ,,

The results of tests go to prove that lapwelded bottles are almost as strong in the weld as in the solid plate. Solid drawn bottles gain their ultimate tensile strength rather at the expense of their elastic limit; but both are largely in excess of the test pressure applied to the bottles. The actual hydraulic test pressure applied to each bottle is $1\frac{1}{2}$ tons, just double the pressure to which it is charged with gas, and it will be seen that this test is well within the elastic limit of the metal, in the case of lapwelded, as well as the solid drawn bottles, and that no permanent injury to the metal can be occasioned by it. It is the custom to select one out of each delivery of new bottles, and either test it to destruction, or have it sawn up in order that a thorough examination of the metal can be made.

For testing the elastic limit of bottles, a good arrangement has been devised by Mr. H. Brier, Manager of the Scotch and Irish Oxygen Company, Glasgow, and published in *The Optical Magic Lantern* for March 1, 1892. It is briefly as follows :—

The bottle to be tested is filled with water and placed vertically in an iron envelope, the envelope is also filled with water to the exclusion of all air, and a perfect joint is made round the neck of the bottle by means of a flexible rubber ring. A small glass tube taken from this envelope or outer chamber serves as an indicator. When the bottle is subjected to hydraulic pressure, any distortion of the metal can be immediately seen by the raising of the water in indicator. If no permanent stretch is given to the metal, the water will return to its original position in the indicator when the pressure is released. If any permanent stretch has been caused this will not be the case, and should such a thing occur in the testing of a bottle it would be immediately rejected.

I think users of oxygen compressed in these high-pressure bottles may rest satisfied, that every reasonable precaution is taken to ensure safety.

In conclusion, in order to prove how safely gas may be transported in these high-pressure bottles, I cannot do better than quote some experiments, which were made by the Scotch and Irish Oxygen Company, in March, 1890. These experiments were made with a view to ascertaining the amount of rough treatment, which a bottle would stand without bursting. Three bottles were all subjected to very severe treatment; they were all of a standard type, viz., $5\frac{1}{2}$ in. external diameter by $\frac{1}{4}$ in. thick and lap-welded. Nos. 1 and 2 were charged with 120 atmospheres oxygen; No. 3 was filled with liquefied carbonic acid. No. 1 bottle was twice raised to a height of 35 ft. and dropped horizontally upon a solid iron block 12 in. square, each blow bending it to the extent of about $\frac{3}{4}$ in. It was then dropped vertically on its round end having a clear fall of 31 ft. when it was found that the impact had only flattened a part of about the size of a penny piece. It was crushed with a 15 ton blow received whilst it lay across an iron block, and it was finally bent with the same blow whilst it was supported on two anvils set 4 ft. apart. No. 2 bottle was dropped horizontally five times from a height af 35 ft. across an anvil, receiving the blow each time on the same spot. No. 3 was dropped twice 35 ft. and then crushed by a 15 ton blow. On these bottles being subsequently tested they were found to contain the full quantity of gas and to be perfectly sound.

It is inconceivable that bottles during transit could undergo anything like the severe treatment to which these were subjected; although their valves often bear testimony to the rough treatment received at the hands of railway porters.

Any latent weakness in a bottle is more likely to make itself known in the gas compressing factory whilst it is being recharged than afterwards in the hands of a customer, and yet I am glad to say that although thousands of these bottles now pass through our hands every week, we have never had an accident through the bursting of one of them in our works. The only two recorded accidents due to the bursting of high-pressure bottles, one in Dublin, 1889, and the other in Glasgow, 1890, were proved beyond any question to be due to the spontaneous combustion of mixtures of oxygen and coal gas, and the consequent creation of a pressure inside the bottle which vastly exceeded what it was calculated to withstand. It is in this possible mixture o gases that an element of danger has hitherto existed in the use of high-pressure bottles. It has been due mainly to the fact that insufficient precautions were taken to avoid the possibility of bottles used for one gas being charged with another. The recognised rule in the trade was to paint oxygen bottles black, and hydrogen (or coal gas) bottles red. This, however, was no absolute safeguard, and the system now adopted (in addition to the different colours of bottles) is to make all valve and other connections for oxygen and hydrogen non-interchangeable. This absolutely precludes the possibility of mixing gases in bottles, and when it becomes universal (as it must in a very few years), I feel convinced that the only real element of danger in the use of high-pressure gas bottles will be removed.

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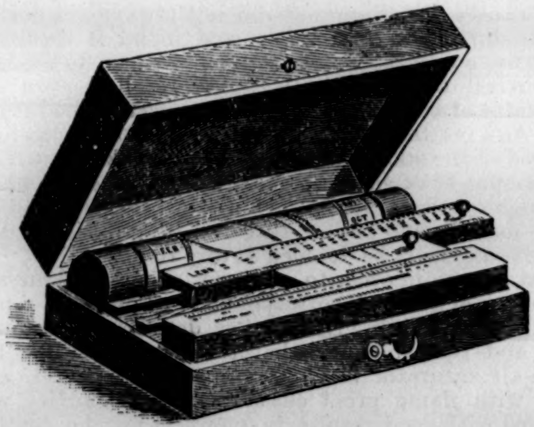
Editorial Table.

Catalogue, Archer & Sons, Liverpool.—In this Catalogue we find several types of extending cameras introduced by this firm. Also a great variety of hand cameras for which they are Agents. "Archer" and other lenses and shutter are shown, also a number of photo-adjuncts. A few optical lanterns are described, but this being their photographic catalogue, they reserve the lantern portion to a large extent to their special lantern catalogue.

Actinograph.—The Actinograph which has been presented by Messrs. Marion & Co., is a little instrument by the aid of which necessary exposures may be ascertained. It consists of four sets of scales corresponding with the light, lens, exposure and speed of plate. To find the Exposure for an ordinary Landscape:—Data given, day, 7th October; hour, 4 p.m.; N. Lat. 52° 30′, Lens and Stop, Doublet F/22.6; Speed of Plate, 15; Light, "Very bright."



1. Turn the revolving scale until the date 7th October is level with the edge of the lens scale. 2. Set the "speed index" to 15 on the speed scale. 3. Move the long slide until the point marked F/22.6 (2) coincides with the curve on the revolving scale marked 8 a.m. and 4 p.m. The exposure to be given will now be found opposite the point marked "very bright," viz. 2 seconds.

"Photography Annual," 2/6, Illife & Son.—Mr. Sturmey is to be congratulated upon his Annual for 1892. It contains 1,170 pages, and the thickness of the volume is just 2 inches. The book is divided into nine sections, and contains—Tables, Tips for Tyros, Record of Progress, Practical Articles, Novelties in Apparatus, Societies, Trade Marks, Directory, &c., together with a number of fine illustrations.

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Correspondence.

THE LIFE OF A GAS CYLINDER.

[*To the Editor.*]

Dear Sir,—I notice in your issue of 1st July a letter from a correspondent, making enquiries as to the life of a gas cylinder. Anxiety on this point is, perhaps, natural, and as it is only right that the public should know the nature of the precautions taken to ensure the safety of high pressure cylinders. I send you copy of an article on this subject which I wrote a short time ago. It contains an answer to your correspondent, and, if reprinted, may interest some of your readers, and tend to create confidence in the use of cylinders.—Yours faithfully,

Kenneth S. Murray, Manager,
Brin's Oxygen Company, Ltd.

34, Victoria St., Westminster,
July 12th, 1892.

CONSTANT SUPPLY OF VAPOUR IN SCOTT'S SATURATOR.

[*To the Editor.*]

Sir,—In the July number Mr. A. Pumphrey makes certain statements which I cannot allow to pass without protest. I do not refer to the question whether a difference of shape in a saturator is. or is not, an infringement of my patent—this is a point which an expert in patent law could answer best—but to the assertion that my saturator fails to give a constant supply of vapour.

Now, I have had a very large correspondence with users of saturators; in fact with the first fifty that were sold, the average number of letters received from each purchaser, after delivery of the goods, was three or four. These letters were enquiries about the manipulation of the apparatus; owing to the use of unsuitable jets and other causes, the lanternist did not always get perfect results during his first trials, and found it necessary to write out a set of questions for me to answer. But in all these letters I cannot recollect even one complaint of a want of vapourising power in the saturator. As a matter of fact, provided the saturator is fully charged at the start, and the nightlight is kept burning, the amount of vapour imparted to the oxygen keeps up to a high standard all through the exhibition; and by using more heat—two or three nightlights instead of one—it can easily be doubled at any time.

Last season, in order to save my clients and myself the labour of so much correspondence, I prepared a new "instructions" bill, giving fuller details of manipulation, and recommended that the jets used with the warm-air saturator should be specially adapted, and fitted with flame proof chambers. This advice was followed with good results in many cases; no further letters passed after delivering the goods, and the average number of letters did not exceed one for each client, these being often voluntary testimonials.

The moral of this is, that saturators are reliable instruments for single lanterns and compressed oxygen, provided that the jets are properly designed and rendered pop-proof in the mixing chamber.

A. W. Scott.

401, Cowbridge Road, Cardiff.

Notes and Queries.

R. Morris states that he washes his prints by laying them one upon the other upon a sheet of glass placed under a tap of running water, and asks for the best method of preventing the water splashing. *Answer.*—Tie a piece of rag over the open end of the faucet, and the water will run in a steady stream without splashing.

F. J.—(1) The particular form of opaque lantern described in our back numbers was invented by Dr. E. B. Foote, Jun., 120, Lexington Avenue, New York. (2) We think it is the best that we have seen.

Amateur.—The print B is overtoned, but A is "all right," as you observe; the former is evidently from a thin negative, and prints from thin negatives will not stand the same amount of toning that can be given to those from vigorous negatives.

Jas. Benson writes, "I have been trying to make a triple condenser. I have magnifying glasses of various styles, can you give me a sketch of one in section?" *Answer.*—If you look at Mr. Chadwick's advertisement for July or the few previous months, you will find a good cut at the lower left-hand corner. The fig. E on it has reference to a piece of glass placed between it and illuminant to prevent breakage.

Perplexed writes: "I understand that Messrs. Platt & Co. have patented a screw arrangement to support the noses of a biunial lantern, might I make one for my own use without being proceeded against for infringement?" *Answer.*—You need have no fear about so doing. We gave a description of such an attachment in our issue of May 1, 1890, long before it was patented. An article cannot be patented after it has been published. The firm may, however, last year, have thought of it independently, but such are the facts.

T. Chellew.—Several correspondents have written to say that they cannot obtain promised slides from the firms you mentioned in last journal. We also wrote asking for a copy, two of the firms explained that they had none, and the third did not reply.

Jas. Callendar.—A reader suggests that you look up the back numbers for particulars of illuminated fountain. See May and July, 1891.

R.S.—We note that Messrs. Colt and Co. have discontinued making the lantern with parabollic reflector. We stated in this journal nearly three years ago that the principal of parallel rays from the illuminant to the condenser was a mistake, and that the light would be playing at cross purposes.

Husbands Bros.—You did not send us the "Stop Valve" to try, as promised, hence our opinion is the same as expressed in last issue. We did not, as you state, refer to an intermediate regulator, but to one to go on the bottle, and as for the article in ——, in which you say the Editor has grasped the meaning, he did not write the account, but merely printed what you sent him. We like to try apparatus and then give our own experience.

Will those Correspondents whose queries are not answered in above column, repeat them, and they will have attention in our next, We have to make this request in consequence of a fire which occurred on 23rd ult., in the building in which our office is located. Our editorial desk with its contents was entirely consumed.